Subject: Science Grade: Third

Standard: #5 The Human Organism

Key Concept: From food, people obtain energy and materials for body repair and growth. The undigestible parts of food are eliminated.

Generalization: Three important nutrients in food are carbohydrates, fats and vitamin C.

Background:

Students are beginning a study of the digestive system and nutrition. The tiers are formed according to students' interest in one of three nutrients. Students will have different content but will complete the activity using the same process and having the same end result.

Each group will be given the same set of food. Be sure there is a variety containing vitamin C, carbohydrates, and/or fats. Supply students with directions for testing their particular nutrient. Each group will prepare a chart indicating the type of food and whether or not it contained their nutrient. You may also want a column for their prediction and then the actual result after testing. They will also prepare a short oral report about their nutrient, explaining why it is important, the recommended daily amount for their age group, foods that contain it, and harmful effects too much or too little can produce. The directions for testing each food follows. **Note**: Vitamin C is used because the test for protein involves chemicals that need fume hoods or are too dangerous for elementary pupils.

This lesson is tiered in ***content*** according to ***interest***.

Tier I: ***Vitamin C***

The test for vitamin in foods:

Equipment: Indicator solution (directions follow), small clear cups, 250 mg vitamin C tablets, food set (include some juices), droppers,

measuring spoons.

Indicator solution:
Starch solution: Put ½ t cornstarch in a saucepan with one cup of water. Place the pan over low heat and stir until the starch dissolves completely. Pour into a clean container and allow to cool completely.

To mix indicator solution: Put 1 t of the starch solution in a jar with one cup of water and 4 drops of iodine. The solution should be blue due to the reaction of the starch and iodine.

To establish a positive test for comparison: Dissolve a 250 mg vitamin C tablet in a cup of water. Put 2 T of the indicator in a small cup and add a drop of vitamin C solution. Swirl. Swirl the cup after each drop. Continue until the liquid turns colorless. Determine the number of drops necessary to turn the liquid colorless. This is a measure of the amount of vitamin C present.

Procedure: Place a drop of juice (or mash the food up with a bit of water until it forms a solution) in a clear cup. Add a drop of the indicator. Swirl the cup. Continue to add a drop of indicator and swirl until the liquid turns colorless or until you are sure the food contains little to no vitamin C. Record the number of drops you used.

Tier II: ***Carbohydrates (Starch only)***

The test for starch:

Equipment: iodine (if you use iodine from the drugstore, you will want to put it in another bottle and dilute it first), paper towels, a tray or pie pan for the food, food set, eye dropper.

Procedure: Place a drop of iodine on each food you are testing. If the drop turns black as it absorbs into the food, the food contains starch.

Tier III: ***Fats***

The test for fats:

Equipment: brown bag paper, water, vegetable oil, eye dropper, food set.

Procedure: Count the number of foods you are testing, add two and fold the brown bag paper into that many squares. On the first square, label "water" and on the second, label "vegetable oil." Place a drop of the appropriate liquid on the correct square. Label the other squares with the names of the food in your set, one square per food. Take one piece of food. Rub it gently on the correct square. Repeat until you have used all the food. Set the paper aside to dry. After the spots dry, hold your paper up to a bright light. Look at the water spot and the oil spot. Any food that left a spot similar to the oil spot contains fat. Water does not contain fat.

Assessment:

Teacher observation and student interviews are used as formative assessment. Accurately completed charts and oral reports are summative assessment, as well as science journals containing hypothesis, problem, data, results, conclusion, etc (parts of a science investigation).

The teacher should conduct a whole class discussion so students can share results, deliver their oral reports, and compare and contrast the various nutrients. A master chart of the foods and nutrients may be prepared by pooling all the data.